LUXATION OF THE CARPO-METACARPAL ARTICULATION OF THE HAND

K. Kartchinov

The luxation of the first carpo-metacarpal articulation (CMA) is a relatively rare finding. Still rarer are the recidival and habitual dislocations of that joint.

CMA is formed by the trapezium and first metacarpal bone. Since the first nucleus of ossification in os trapezium appears in the 5th year after birth, the centre of ossification in the proximal end of the first metacarpal bone appears after the 10th month (up to the second year).The trapezium bone, at its maximum development, maintains a 5-angular form and together with the first metacarpal bone builds a "saddle" concavity, which is "ridden" by the proximal end of the first metacarpal bone.

The trapezium is inserted and "divides" the proximal ends of the first and second metacarpal bones by one conic prominence.

The first CMA forms itself as a self-dependant and self-territorial articulation differing from the rest 4 CMA which maintain a common joint-cavity divided by connective tissue septa. Thus, the first CMA possesses an individual joint-capsule which is comparatively wide (loose) and has a self-connecting apparatus: ligamentum trapezo-metacarpalis primum.

The differentiation of the first CMA is functionally accomplished and represents the evolution of mankind. The CMA has 2 motion-axes which perform the following function: flexion and extension (volume: 35°—45°), abduction and adduction (volume: 50°—60°) and possible rotation (25°—35°). Together with the rest joints of the thumb the first CMA is the base of opposability of the thumb against the other fingers.

The innate abnormalities of os trapezium and first metacarpal bone are considered to be the reasons for the manifested habitual luxation of CMA. The anomalies of the trapezium are mainly elongation, extension and deformation of the bones which build the CMA, also some synostosa of os trapezium and os trapezoideum. The changed and released capsular and ligamental apparatuses of CMA, as well as the insufficiency of the tendinous apparatus surrounding the joint, also play an important role. The famous fracture of Bennett is a frequent reason for the traumatic disorders of the first CMA. It can be performed either with a luxation or without a luxation of the same joint, followed by a dislocation of the first metacarpal bone in a dorso-radial direction. However, there are certain luxations of this joint without any Bennett-fracture.

The luxation is conditioned by the loose and isolated CMA which performs a wide range of movements and poorer defence of the ligamental apparatus. The dislocation is in a dorso-radial direction, and more rarely — in a palmo-medial direction. There are complete and incomplete luxations. Our study covers 5 complete luxations of the CMA and the reason for it in 3 of

the cases is a flare-explosion in the hand. The incomplete luxations acquire a particular touch of the trapezium and first metacarpal bone. The capsule

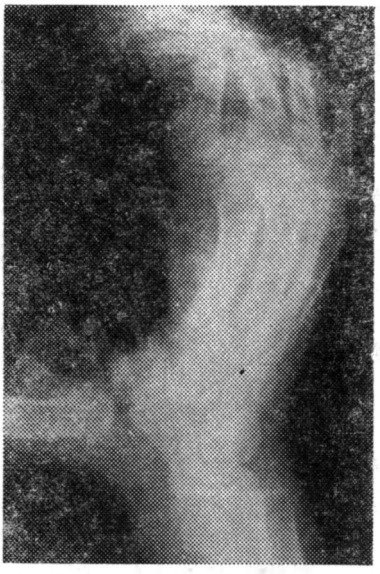

Fig. 1: Traumatic luxation of the first CMA

Fig. 2: Manual reposition and application of Kirschner-needle inserted via CMA

is only overcricked in some cases. However, the complete luxations show a totally dislocated base of the first metacarpal bone out of trapezium and upwards in the direction of the navicular bone.

The luxation of the first CMA can be diagnosed by the thumb-base deformation, restriction or disability of the thumb functions (especially to catch) and pain (traumatic luxation). The habitual luxation is painless very often, usually in childhood.

The degree of luxation can be determined by X-rays examination which detects also eventual fractures of the first metacarpal bone.

The arthrosic disorders, after untreated or poorly treated luxations, are the most important complications. The thumb movements are painful.

The setting of the bones after a fresh luxation of the first CMA can be easily performed by pulling the thumb and pressing the zone of the joint. However, to keep the set bones in a proper (normal) state is far from easy. It is recommended that a plastersetting must be done for at least 3—6 weeks, combined with an extension of the thumb. When there is a poor reposition or uneffective fixation, subluxations or recidive luxations can be obtained with a well expressed "symptom of Klavish", resulting in an early arthrosic process. Therefore, after reposition, the joint must be retained in a stable position by a Kirshner needle: our experience with 5 traumatic luxations of CMA (fig. 1 and 2).

Forming of ligamentum to support the capsule of CMA is indicated when subluxations or recidive and habitual luxations without any arthrosis-processes are manifested. Bunnell (1956) suggests a tendon graft which

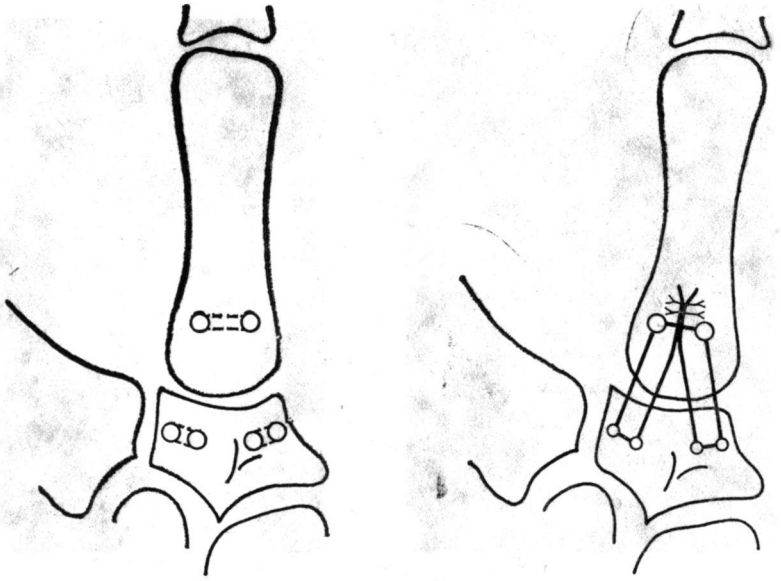

Fig. 3, 4: Our operative technique of forming (building) a dorso-radial ligamentum

surrounds the first metacarpal bone and CMA and ends at the thenar prominence where by using a knob the first metacarpal bone is stretched in a palmar direction. Eaton and Littler (1969) apply the longitudinal half of the tendon of m. flexor carpi radialis with a preserved distal insertion. The tendon is placed via canal of the first metacarpal bone, surrounds the CMA and is fixed to the same tendon again. Cho (1970) reports the role of the tendon of m. abductor pollicis. Kestler (1966) applies ligamentoplastics by using the tendon of m. extensor pollicis brevis. Eggers (1945), Stock and Weber (1974), Ashkenazi (1965), Bogdanov (1966), etc. report their experience in the treatment of this luxation.

Arthrodesis of the first CMA in a proper physiological position is recommended in the treatment of old, unstable dislocations, with degenerative complications of the joint-cartilage and functional disorders of the thumb: Grenshaw (1971), Fantato (1966), Usoltzeva and Mashkara (1975), Matev (1972) etc. Others: Swanson (1968), Kessler and Axer (1971) replace the first CMA by siliconic prothesa.

We suggest a new operative technique of building a ligamental apparatus of CMA on its dorso-radial part in our cases with habitual subluxation and luxation of CMA. We use the longitudinal half of the tendon of m. palmaris longus. It is inserted via three small canals of the first metacarpal bone and os trapezium, forming a broad ligament on the dorso-radial part of the joint-capsule (fig. 3 and 4).

Thus, the first metacarpal bone is kept in a proper position in the saddle-cavity of the trapezium (fig. 5 and 6). 2 patients with a habitual luxation of the first CMA are treated by the suggested technique.

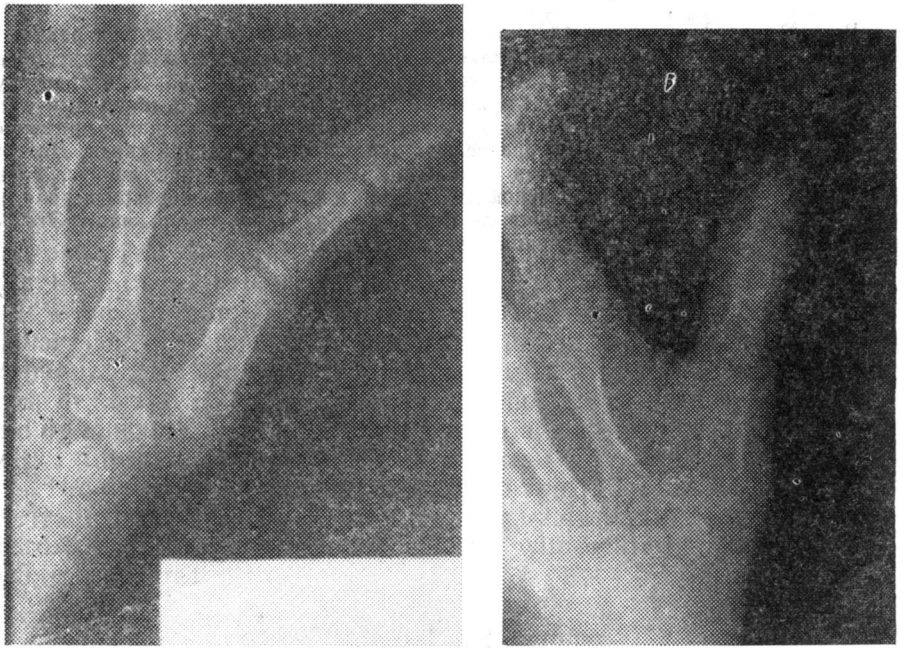

Fig. 5, 6: X-rays investigation of the habitual luxation of the first CMA before and after operation

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ВЫВИХ СЕДЛОВИДНОГО СУСТАВА РУКИ

К. Карчинов

РЕЗЮМЕ

Вывих первого запястно-пястного сустава встречается относительно редко. При свежих вывихах вправление осуществляется сравнительно легко, но их фиксирование в правильном положении достигается гораздо труднее. Такое фиксирование осуществляется нами с помощью иглы Киршнера, проведенной через седловидный сустав.

При привичных вывихах первого запястно-пястного сустава нами применяется новая оперативная техника для образования дорсально-радиальной связи. Для этого используется продольная половина сухожилия мышцы Палмарис лонгус, которая проводится через три канальца первой дорсальной кости. Таким образом первая пястная кость задерживается в седловидном суставе в правильном положении. Этот способ был применен нами при операции двух больных.